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VOICE OF THE ELECTRIC UTILITY INDUSTRY

Power-Gen looks through '90s

Industry leaders name environment, energy politics among key issues; air, fuel, nuclear technologies emerge

TAMPA, FL—At the 4th International Power-Gen Exposition & Conference, Dec. 4-6, industry leaders noted several recurring themes, including the growth of environmental consciousness and fear that socio-political structures might not allow adequate growth in power-system resources.

About 8000 people attended, from 37 countries, said David Johnson, president, PennWell Conferences and Exhibitions. In four years, it has become one of the world's largest power generation shows. The 467 exhibits covered 85,900 ft^2. In three days, 12 concurrent sessions produced more than 200 papers. *Electric Light and Power* and *Power Engineering* magazines co-sponsored the conference.

Continued growth of Power-Gen parallels the industry's expected power-generation expansion

Five speakers in the keynote session outlined critical problems and opportunities in the U.S. and Eastern Europe.

"We are in the business of providing electricity, but we're also in the business of preserving the environment," noted Hugh Culbreath, director and former chief executive officer of TECO Energy Inc., who welcomed attendees.

Vito Stagliano, U.S. Department of Energy, expressed DOE's disappointment about the Senate's failure to consider comprehensive energy legislation, S.1220. Stagliano said he would have felt better "if senators had debated the issues and rejected them on their merits. But they didn't even consider them." Stagliano is DOE associate deputy undersecretary, policy, planning and analysis.

William Conway, senior counsel for the Senate Committee on Energy and Natural Resources, said that although the bill returned to committee, "We will win in the end," including reform of the Public Utility Holding Company Act of 1935. Even with more power-system competition, "There will be outstanding reliability," Conway suggested. "If you don't produce the power, you don't get paid. Competition sharpens the mind wonderfully," he added.

David Deieso, president and chief executive officer of Research-Cottrell Co., said perceptions are sometimes more important than facts. "What the public believes, right or wrong, influences public policy. We have to change business culture to match the times.

"It's important for the public to hear that environmental responsibility is good business," Deieso added.

Vitaly Sklarov, minister, Ukrainian Ministry of Power and Electrification, said a major goal for the Ukraine, and other parts of Eastern Europe, is cleaner, safer power generation. This means closing Chernobyl-like nuclear reactors and upgrading other facilities, particularly coal plants.

Main polluter

"The main polluter in the Ukraine is myself," he admitted, speaking for the ministry's power plants. Sklarov was the first Soviet official to get a call from Chernobyl after the 1986 accident.

LATE NEWS

Commonwealth Edison Co. approved a revised, 29-year franchise agreement with the city of Chicago on Dec. 12. After rejecting stringent affirmative action rules the city tried to attach, CECo took a revised plan with stronger guidelines than in the original deal. (*EL&P*, 12/91, p.1).

Arizona Public Service received a rate increase Dec. 5, with a 5.2-percent base-rate hike, a $265-million write-off on Palo Verde nuclear plant, and provisions including a customer-supported fund to expand solar energy and energy efficiency programs.

El Paso Electric expressed cautious optimism about securing credit by Dec. 16 to avoid possible bankruptcy protection filing.

Pacific Gas & Electric opened its $7.5-million, 25,000 ft^2 energy efficiency center on Dec. 5.

Forum reports progress toward next nuclear order

SAN FRANCISCO – Funding for first-of-a-kind engineering of the next generation of nuclear designs is nearly complete, announced Sherwood Smith, chairman of the Nuclear Power Oversight Committee (NPOC) at the recent Nuclear Energy Forum here.

For four designs, total funding required is an estimated $1 billion.

NPOC is the nuclear utility organization that announced a new "strategic plan" for building new nuclear plants a year ago at this meeting (*EL&P*, 12/90, p.1), in the wake of the acid rain crackdown on coal-fired plants in the Clean Air Act Amendments of 1990.

The plan's goal is to place an order for a new nuclear unit by 1995 for operation by the year 2000. Funding for first-of-a-kind engineering is the next step toward developing the new designs.

"Utilities and vendors together will match the federal government's $100-million contribution to bring the total effort to $200 million," said Smith, who is also chairman of Carolina Power & Light Co.

"We now have nearly 90 percent of the

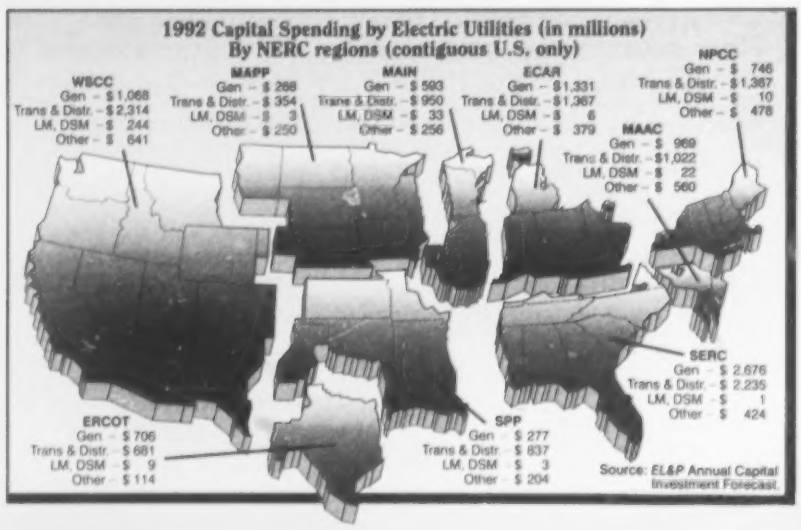
Continued on page 6

Economy delays spending; surge expected to start in '93

BARRINGTON, IL—Cautions about the sluggish economy has delayed electric utilities' spending surge by a year, but forecasted investments over five years have increased, according to *Electric Light & Power*'s Annual Capital Investment Forecast (see report, this issue).

EL&P's survey shows rapidly increased spending over the next four years, reaching levels higher than forecasted a year ago. Utilities projected a larger five-year total this year, almost $139 B compared to last year's $132 B.

The report provides projections and analysis of five years of electric utility spending and examines the issues reshaping the industry through the eyes of industry leaders.


1992 Capital Spending by Electric Utilities (in millions)
By NERC regions (contiguous U.S. only)
WSCC
Gen – $ 1,068
Trans & Distr. – $ 2,314
LM, DSM – $ 244
Other – $ 641
MAPP
Gen – $ 268
Trans & Distr. – $ 354
LM, DSM – $ 3
Other – $ 250
MAIN
Gen – $ 593
Trans & Distr. – $ 950
LM, DSM – $ 33
Other – $ 256
ECAR
Gen – $ 1,331
Trans & Distr. – $ 1,367
LM, DSM – $ 6
Other – $ 379
NPCC
Gen – $ 746
Trans & Distr. – $ 1,367
LM, DSM – $ 10
Other – $ 478
MAAC
Gen – $ 969
Trans & Distr. – $ 1,022
LM, DSM – $ 22
Other – $ 560
SERC
Gen – $ 2,676
Trans & Distr. – $ 2,235
LM, DSM – $ 1
Other – $ 424
SPP
Gen – $ 277
Trans & Distr. – $ 837
LM, DSM – $ 3
Other – $ 204
ERCOT
Gen – $ 706
Trans & Distr. – $ 681
LM, DSM – $ 9
Other – $ 114
Source: EL&P Annual Capital Investment Forecast.

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News Briefs

JILL MINNER, Special Projects Editor

ABB, Siemens form alliance for nuclear steam generators

Two international power industry giants are joining forces in an attempt to double their chances at a $2 billion bid for replacing 53 steam generators at U.S. nuclear plants.

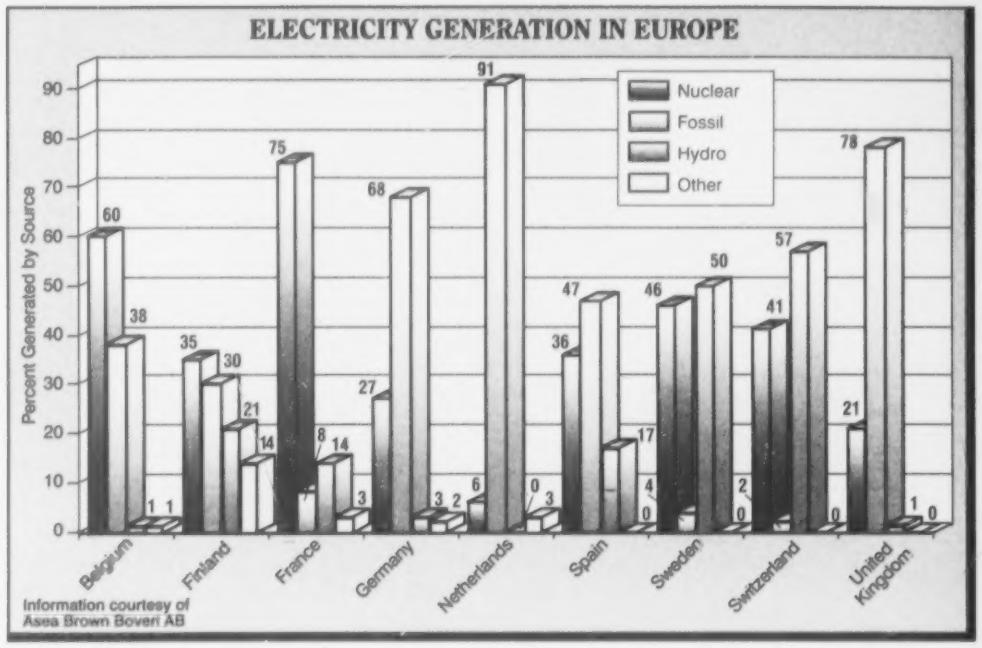
Asea Brown Boveri Inc. and Siemens Nuclear Power Corp. announced intent to form an equally owned U.S. company. Observers were surprised at the Dec. 4, 1991, memorandum of understanding between two traditionally competing companies.

The new company would supply replacement steam generators and related services for plants with pressurized water reactors and offer long-term maintenance services. It would be based in Chattanooga, TN, the present manufacturing center for ABB's subsidiary, Combustion Engineering Inc.

The alliance seems in direct response to the Joint Procurement Corp.'s request for bids on steam generators put out in October 1991 and due Jan. 3. Those 53 steam generators at 10 utilities—about 18 generating units, four or five models—could cost as much as $2 billion, said Nick Santoro, program manager at JPC, based in Birmingham, AL. The work is planned for 1992-2000. He said Westinghouse was the original supplier.

"This is a generic specification with common requirements," said Santoro. "The utilities felt like they could get a better price by working together [through JPC]."

Santoro identified six bidders, as of Dec. 9: Westinghouse, ABB Combustion Engineering, Siemens KWU, Framatome, Voest Alpine, and Babcock and Wilcox. More than one company could get a share of the bids, he added.



Average IOU utility pays 22.4% U.S. taxes

U.S. investor-owned electric utilities had a federal tax expense of more than $5.78 billion in 1990, an increase of $500 million over 1989, translating to a tax rate of 22.4 percent, according to Edison Electric Institute. This was twice the average state and local tax rate of all U.S. corporations, EEI said.

Figures were based on a survey of members and eliminated the non-cash accounting earnings item, Allowance for Funds Used During Construction. AFUDC is not considered taxable since it is cash to be received in the future, EEI noted.

DOE aims to expand the natural gas market

The Department of Energy in November announced plans for a joint DOE-National Association of Regulatory Utility Commissioners conference to be held in Phoenix, AZ, Feb. 3-5, to encourage efficiency and expansion of natural gas markets.

Deputy Secretary of Energy W. Henson Moore said in the announcement, "I believe the long-term future of natural gas depends on three key initiatives of the National Energy Strategy: PUHCA reform, pipeline construction reform and an increase in the use of alternative fuels."

Gulf States, Southern end contract dispute

Gulf States Utilities Co. and the Southern Co. formally settled a lengthy purchased-power contract dispute on Nov. 7.

GSU paid Southern $6.6 million cash. Southern also gets $73 million from an escrow account established by the federal court while the contract suit was pending. GSU issued six million shares of common stock to Southern and gave $160 million in promissory notes. GSU's cash outlay in 1991 and 1999 (when notes are due) could total $167 million. Gulf States recorded a second-quarter 1990 after-tax charge of $135 million. This ends the power-sale agreement and litigation.

'92 sales may rebound

The DOE's Energy Information Administration predicted a noticeable rebound in 1992 electricity sales "if the economy rebounds and the temperatures are normal. Despite the recession in 1991, sales were strong because of above normal temperatures during the spring and summer," according to an EIA statement.

Town wants a coal plant

In a non-binding Nov. 5 ballot question, Taunton, MA, citizens voted 55 to 44 percent against prohibiting a proposed 150-MW coal-fired cogeneration project there.

"To the best of our knowledge, this is the first such vote in many years in favor of any major new coal-fired capacity in Massachusetts," said Kenneth P. Roberts, project manager for developer Silver City Energy. A state siting council in early December 1991 was still reviewing the project, in final licensing stages. The circulating fluidized bed technology would provide 500 jobs and $1 million a year in lieu-of-tax payments. Silver City Energy participants are Constellation Energy, U.S. Generating Co. (formerly PG&E/Bechtel Generating) and Cogeneration Services Corp.

Rafters may raise rates on Western area power

Recreational rafting and environmental interests added operating constraints and reduced power output by 30 percent from the U.S. Bureau of Reclamation's Glen Canyon Dam. As a result, utilities in six Western states receiving electricity from Western Area Power Administration incurred an average 11.7-percent rate increase on Dec. 1, '91, and may get another in July or October.

Allowed capacity from Glen Canyon Dam dropped about 400 MW to 950 MW, requiring WAPA and others to use more expensive alternatives. Tri-State Generation and Transmission Association, based in Denver, said the rate increases could double its cost for WAPA power to more than 22 mills per kilowatthour, raising costs by $8.5 million in '92. Increases vary by utility; other affected states are: AZ, NM, NV, UT, and WY.

CIRED establishes permanent office

The International Conference on Electricity Distribution (CIRED) established a permanent office in Belgium, according to H. Wayne Beaty, publicity director for the U.S. CIRED Liaison Committee and *EL&P*'s senior editor—power delivery.

The 11th international conference, for the design, construction, and operation of distribution systems, will be April 22-26 in Liege, Belgium. The office location is CIRED General Secretariat, Galerie Ravenstein, 4, Bte 6, B-1000 Bruzelles, Belgium; phone 32 2 511 1970; fax 32 2 511 2938.

Virgil G. Rose, of Pacific Gas & Electric and the chairman of the U.S. CIRED Liaison Committee said, "I believe this is a significant development in advancing CIRED as the authoritative distribution conference in Europe."

DOE, ComEd grants to strengthen nuclear engineering programs

The U.S. Department of Energy and Commonwealth Edison Co. announced that they will take part in a $500,000 pilot program to help a group of university nuclear engineering departments strengthen their academic programs relating to nuclear fission. As part of the program, DOE and ComEd will provide matching grants totaling up to $100,000 for each school's nuclear engineering department.

"This new partnership between private industry and government should serve as a model for other nuclear utilities and organizations interested in joining DOE in similar matching grant programs," said ComEd Chairman James J. O'Connor.

ComEd has nominated five universities to receive the first grants, they are: University of Illinois at Champaign-Urbana; Massachusetts Institute of Technology at Cambridge; University of Michigan at Ann Arbor; Purdue University, West Lafayette, IN; and University of Wisconsin-Madison.

To qualify for the matching grants, each department must submit an application describing how they would use the grant money and then provide annual progress reports reviewing fund allocations.

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PE T-line use depends on decision after EMF hearings

PHILADELPHIA—In a hearing about operating a nearly completed, $19.8-million, 230-kV Philadelphia Electric transmission line, three medical experts testified that resulting electric and magnetic fields (EMF) would pose no threat to human health.

Even with a negative regulatory outcome, PE doesn't expect to abandon the project, saying it would appeal any ruling preventing the line's use.

About nine hearings were held from August through at least December before an administrative law judge (ALJ) for the Pennsylvania Public Utility Commission. The ALJ will make recommendations to the PUC, which will decide if PE can operate the line.

Residents near the 12.8-mile line requested the hearings, primarily on EMF, after regulatory approvals were already given, claiming they weren't properly notified of the project. A state court remanded the issue back to the PUC to consider the EMF-human health issue. Any effect on property values is not to be considered.

"My overall conclusion is that there is no basis to conclude that power frequency electric and/or magnetic fields have adverse effects on the health and function of the endocrine or immune systems," said Dr. Richard Bockman, who holds an MD from Yale University, a Ph.D. in biochemistry from Rockefeller University.

Dr. Philip Cole testified, "Taken together, the epidemiological reports fail to demonstrate any strong or consistent pattern of association between EMF and cancer among human beings.

"Indeed, even among the positive studies, findings are not supported by the internal characteristics of the data. The summation can only be that, to date, there is no demonstrated relationship between EMF and cancer in human beings," said Cole, who holds a masters and doctorate of public health in epidemiology from Harvard University, and is a professor in that area in a cancer center at the University of Alabama.

On the line

The line between PE's Woodbourne and Heaton substations was nearly completed in late November 1991 "and will be ready to be energized in the spring of 1992," the utility noted in a statement. The line is to accommodate rapidly expanding electrical needs and assure service reliability for growing customer demand in Bucks and Montgomery Counties.

The line's right-of-way is about 100 feet from the nearest house, but 200 or more feet away from most houses, according to PE spokesperson Bill Jones. A group of about 150 people are protesting, he added. The utility purchased the right-of-way and existing deenergized 138-kV line from a railroad in 1989 for $3 million and notified municipalities as state regulations require.

"If we don't get this operating, we may be looking at severe reliability problems. The need is there," said Jones.

EMF/cancer study results supply no direct answer

PALO ALTO, CA—Findings from an EMF/cancer study sponsored by the Electric Power Research Institute showed a lack of consistent association between childhood leukemia risk and direct measurements of electric or magnetic fields (EMF).

Preliminary results, reported in *EL&P*, 3/91, p.1, seemed consistent with the final report, published in the Nov. 1, 1991, American Journal of Epidemiology.

The study offered some support for a relationship between household wiring configurations or children's use of electrical appliances and leukemia risk.

EPRI urged further research. The study covered 232 children under 11 years of age with leukemia in Los Angeles County and relied on memory for documentation of appliance use. A University of Southern California researcher conducted the study.

NERC winter peak increases 7.6%; new facilities added

PRINCETON, NJ—This winter, U.S. peak electric demands are expected to increase 8.1 percent, while Canada's peaks will rise 4.8 percent, according to the "NERC 1991/92 Winter Assessment." Overall, the North American Electric Reliability Council expects a 7.6-percent increase for the period.

Generating capacity and fuel supplies are generally adequate, but some transmission facilities will near their limits as some utilities use systems to optimize economic transfers in eastern ECAR, MAAC and a part of SERC, NERC said.

"In addition, new jointly planned shunt capacitor banks recently installed in eastern ECAR have improved overall system voltage and reliability during heavy west-to-east transfer," NERC reported.

Southeast shows largest gain

The region reporting the highest gain in projected peak demand is SERC with 13.6 percent, citing a mild 1990/91 winter. WSCC was the only region with a lower peak, dropping 2.9 percent from last year. WSCC noted that the 1990/91 peak was reduced by use of direct load management and interruptible demand contracts during colder-than-normal temperatures.

Only Ontario Hydro said reserve margins are forecast to be lower than desired, adding that purchases may be required to supplement reserves.

During the three winter months, expected generation additions number more than 16, including the following units over 300 MW: Darlington nuclear unit No. 1, 881 MW, December 1991, in NPCC; LG 2A No. 23, 316 MW, hydro, December 1991, in NPCC; and AES Shady Point, 320 MW, steam/coal, January 1992, in SPP.

Two of eight transmission upgrades 230 kV and above include: J.K. Spruce-Cagnon Road (double circuit) 37.4 miles, 1206 MVA capacity, 345 kV, December 1991, in ERCOT; and Kanawha River-Matt Funk, series capacitors 178 MVA, shunt capacitor banks rated in Mvar, 230 kV, January 1991, in ECAR.

The data, provided by the regional reliability councils, covers December 1991 through February 1992.

Councils

The councils mentioned are: East Central Area Reliability Coordination Agreement (ECAR), Mid-Atlantic Area Council (MAAC), Southeastern Electric Reliability Council (SERC), Western Systems Coordinating Council (WSCC), Northeast Power Coordinating Council (NPCC), Southwest Power Pool (SPP), and Electric Reliability Council of Texas (ERCOT).

For more information, contact NERC, 101 College Road East, Princeton, New Jersey 08540-6601; (609) 452-8060.

SUPPLY AND DEMAND OF ELECTRICITY IN CANADA

	1989	2000	2010
Generating Capacity (MW)[a]	**103719**	**121265**	**140847**
Domestic Peak Demand[b]	82489	92692	107257
System Peak Demand[c]	88933	101509	118956
Remaining Capacity	14786	19756	21891
Percent of System Peak	17	19	18
Generating Capacity by Fuel Type (MW)[d]			
Hydro	57470	66275	78602
Coal	16954	18793	20018
Nuclear	11229	14528	16560
Oil	5502	5521	5654
Natural Gas	2522	2779	2845
Other	3516	5231	6798
Energy Production (TWh)	**483**	**585**	**671**
Hydro	288	359	411
Coal	86	96	114
Nuclear	75	105	113
Oil	17	9	13
Natural Gas	14	12	16
Other	3	4	4
Domestic Consumption (TWh)	**473**	**543**	**630**
Gross Exports	**18.5**	**45.3**	**46.8**

Numbers have been rounded.
[a] Generating capacity in this table includes purchased capacity.
[b] These numbers are the sum of provincial peak demands, which are not necessarily coincident peaks. To this extent, remaining capacity and percent of system peak values may be understated on a national basis.
[c] System Peak Demand total includes Domestic Peak Demand amount for Newfoundland rather than system peak demand because of a large sales component to Quebec which would otherwise be double counted.
[d] Note that this excludes purchased capacity.

Source: "National Energy Board Canadian Energy Supply and Demand 1990-2010."

State regulators support clean-air details, promote gas cooling

SAN ANTONIO, TX—State regulators resolved to help clean-air amendment compliance and promote the use of natural gas for cooling and humidity control, at the 103rd Annual Convention of the National Association of Regulatory Utility Commissioners held here in November.

In other action, Kenneth Gordon, of the Maine Public Utilities Commission, succeeded William D. Steinmeier, of the Missouri Public Service Commission, as NARUC president.

Among the resolutions, NARUC:

- Supported market mechanisms offered by third parties to promote an efficient and successful sulfur-dioxide emission allowance trading market. It encouraged states to consider adopting policies to allow their jurisdictional electric utilities to use market mechanisms when the commission finds it appropriate and in ratepayers' interest.
- Promoted formation and use of bonus SO_2 allowance pools to share the risks and rewards when the extra allowances are allotted. If all eligible utilities ask for the expected extra allowances there won't be enough to go around, likely prompting a first-come first-served telephone call-in to award them. Generating companies joining together in a pool can share any rewards, while dividing the risk. NARUC discouraged states from penalizing participation in such pools.
- Recommended that gas utilities promote gas cooling in short- and long-term resource planning, that NARUC members support additional research for gas cooling, and encourage local gas utilities and pipelines to develop programs to advance efficient and economical gas cooling and humidity control as appropriate for the state or service territory.
- Stated that Securities and Exchange Commission policy should not preclude the Federal Energy Regulatory Commission or states from exercising lawful ratemaking authority. NARUC said that the SEC has deemphasized its administration of the Public Utility Holding Company Act by calling for repeal of the law and reducing resources devoted to utility regulation. NARUC also expressed concern that current legislation would exempt wholesale power generators from PUHCA through FERC review of wholesale power sales. Litigation between FERC and SEC has caused uncertainty, NARUC added.
- Resolved to cosponsor, with the Automatic Meter Reading Association, automatic meter technology and remote access information and control seminars. NARUC declined to help financially, but asked that its committee on finance and technology have advanced approval of program content and seminar procedures to protect NARUC interests. That committee is to report developments back to the executive committee.

Kenneth Gordon
NARUC president

Oglethorpe Power's load management saves $14.5M

TUCKER, GA—Oglethorpe Power Corp. and member systems claimed savings of more than $14.5 million during 1991 for consumers through load-management efforts.

The savings, in purchased power and transmission investments, resulted from a statewide network of more than 328,000 radio-controlled load management switches coordinated through OP's system control center.

Electric water heaters, heat pumps, central air conditioners, and irrigation pumps are connected to OP-controlled switches in a voluntary and free program to cut peak electricity demand.

Heat pumps and air conditioners are cycled off for 7.5 minutes each half hour; water heaters usually are turned off for longer periods.

COMMENTARY

Greetings to EL&P readers

I would like to use the "Commentary" space this month to say hello to all my old friends at *Electric Light & Power* and to readers who may remember me from my previous tenure here. In case you haven't heard the news yet, Bob Lincicome has retired as editor of *EL&P* and I have been named to replace him. In a way I'm coming back home because I worked for *EL&P* for 15 years before leaving in 1986. When I left *EL&P*, I didn't leave the electric utility industry. I have been editor of *Power Engineering* magazine for the past six years. For those of you not familiar with *Power Engineering*, it covers the power generation industry – both utilities and non-utilities. Now I am editorial director of both magazines. What does that mean for *EL&P* readers? I hope it means that in the future you will like the magazine even more than you have in the past.

Bob Lincicome and his staff have built a strong and loyal readership and I hope I can build on that. Will *EL&P*'s editorial emphasis change? No, it won't. The magazine will continue to be the voice of the utility industry. It will continue to cover the entire scope of the utility industry. It will continue to be published in a tabloid, news format with a strong emphasis on technical developments in addition to covering the news. How can a monthly magazine cover the news? *EL&P* may not be the first place you see coverage of an event in our industry or affecting our industry, but it should be the place you see the most complete and insightful coverage. The significance of national events should be a lot clearer to you after you've read about them in *EL&P*.

How will the magazine's editorial policy and attitude change? In this "commentary" space we will attempt to be the utility industry's strongest defender and most articulate critic. We have no hidden agenda. We have only our own sense of what is best for the industry. I'm using the word "we" to refer to the entire staff. I plan to make this space available to others on the staff to express their opinions.

The "letters" section on this page belongs to you. We welcome your comments, ideas, and suggestions and will publish them when they are of interest to our readers. That includes disagreement with our opinions or our version of the facts. My policy is to publish opposing points of view, corrections, and disagreements without editorial rebuttal. The purpose of that is to encourage you to write to us, whether it's pro or con. The best way to approach the truth is to publish as many responsible points of view as possible. I can not promise to strictly maintain past points of view on industry issues as expressed in *EL&P*. First, I have my own opinions which may not always agree with those of my predecessor and, second, my opinions tend to change as I learn more about issues. I can only promise to attempt to give you enough of the facts and reasoning behind the opinions expressed here so that you can judge their validity for yourself.

Let me give you an example. As editor of *Power Engineering* over the past six years I have observed and reported on the rise of the non-utility power generation industry. I have walked a fine line between the conflicting interests of my utility and non-utility readers. However, I have come to recognize the valuable contribution being made by non-utility power and to value the new spirit of competition it has brought to the entire industry. I have urged more open access to utility transmission systems to accommodate the growth of non-utility power.

Now I find myself as editor of a utility publication. I am not going to change my opinion on transmission access merely because of my change in title. However, I do promise to keep an open mind and I reserve the right to refine my position as I learn more about the utility side of this issue – as I undoubtedly will.

Thank you for your readership. I hope it will continue. I hope we continue to serve your needs. If you have any suggestions, let me know.

Robert Smock, Editorial Director

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DSM worksheet: Check the regulatory incentives in each state

WASHINGTON – Recovery of demand-side management (DSM) related lost revenues and provisions for shareholder incentives on DSM figure prominently in states' efforts to remove disincentives and provide positive incentives for DSM.

Check list

Using the table below, check off the provisions your state has in place.

☐ 1. State has no formal actions to provide lost revenue recovery and/or shareholder incentives.
☐ 2. State is developing incentives through formal proceedings.
☐ 3. State has incentives in place.

Some state regulations allow DSM program cost recovery through:
☐ 4a. A balancing account. This is a rate mechanism that reconciles, with interest, a utility's collections from ratepayers for DSM to its actual expenditures. Its use allows utility recovery of full DSM expenditures and ensures no profit is gained by underspending the DSM budget.
☐ 4b. Ratebasing. As with supply-side resources, this allows utilities to capitalize and amortize expenditures and earn a return on the investment during the amortization period.

Lost revenue recovery offsets the decrease in base revenues attributable to DSM programs. It can be achieved by:
☐ 5a. Recovery of the estimated amount of lost base revenue specifically attributed to DSM.
☐ 5b. A mechanism to automatically adjust base revenue to an authorized amount, eliminating revenue fluctuations due to weather, general economic conditions, DSM, or sales promotions. These are often called "ERAMs" after California's Electric Revenue Adjustment Mechanism.

Types of shareholder incentive mechanisms include provisions so that utilities may:
☐ 6a. Receive a percentage markup on certain DSM expenditures.
☐ 6b. Be eligible to earn a greater-than-normal return on equity for rate-based DSM expenditures.
☐ 6c. Have overall return on equity re-adjusted in response to quantitative or qualitative DSM performance measurements.
☐ 6d. Receive a percentage share (gross and/or net) attributable to DSM programs.
☐ 6e. Get a specific bonus amount for each kilowatt and/or kilowatthour saved through DSM.

☐ 7. DSM shareholder incentive mechanism is in place. Where incentives are specific for a utility, that utility is named.

This data was prepared by Barakat & Chamberlin for the National Association of Regulatory Utility Commissioners' Subcommittee on Incentive Regulation and Rate Design in November '91.

More information

For more information, contact NARUC, (202) 898-2200, facsimile (202) 898-2213.

State regulatory influence on demand-side management

Alabama 1
Alaska 1
Arizona 3 by generic commission order
Arkansas 1
California 3, 4a, 4b, 5b, 6a, 6d, 7—Pacific Gas & Electric, San Diego Gas & Electric, Southern California Edison, Southern California Gas
Colorado 3, 4b, 6d, 7—Public Service Co. of Colorado
Connecticut 3, 4b, 5a, 6b, 7—United Illuminating
District of Columbia 3—regulatory changes recently occurred, 4b, 5a, 6d, 7—Potomac Electric Power
Delaware 1
Florida 2, 4a, 4b
Georgia 2
Hawaii 2, 4a
Idaho 3—by generic commission order, 4b, 6c
Illinois 1, (4a, 5a for two utilities' DSM research and pilot programs, but not for full-scale programs)
Indiana 3—regulatory changes recently occurred, 5a, 6d, 7—PSI Energy
Iowa 3—by generic commission order, 6d
Kansas 3—by statute, 6b
Kentucky 1
Louisiana 1
Maine 3, 4a, 4b, 5b, 6d, 7—Central Maine Power
Maryland 3, 4a, 4b, 5a, 6d, 7—Potomac Electric Power
Massachusetts 3-mechanisms vary, 4a, 4b, 5a, 6e, 7—Massachusetts Electric, Western Massachusetts Electric
Michigan 3—mechanisms vary, 4a, 4b, 6c, 6e, 7—Consumers Power
Minnesota 3, 4b, 5a—Northern States Power (NSP) may recover 50% of any interruptible rate discounts it offers which fall above levels built into the 1991 test year. Midwest Gas may recover some costs, 7—NSP.
Mississippi 1
Missouri 1
Montana 3—by statute, 4b, 6b
Nebraska 1
Nevada 2, 4b
New Hampshire 3, 4a, 5a—recovery of lost revenues allowed, but utility must propose mechanisms, 6d, 7—Granite State Electric
New Jersey 3—by generic commission order, 5a—recovery of lost revenues allowed, but utility must propose mechanisms, 6d, 6e
New Mexico 2
New York 3—features vary, 4a, 4b, 5a, 5b, 6c, 6d—Central Hudson, Consolidated Edison, Long Island Lighting Co., New York State Electric & Gas, Niagara Mohawk Power, Orange & Rockland, Rochester Gas & Electric
North Carolina 2
North Dakota 1
Ohio 3—by generic commission order, 4a, 5a, 6d
Oklahoma 1, 4b
Oregon 3, 4b, 5a, 6d, 7—Portland General Electric
Pennsylvania 2, 4b
Rhode Island 3, 4a, 6d, 7—Narragansett Electric
South Carolina 1
South Dakota 1
Tennessee 1
Texas 3—by statute, 4b, 6c
Utah 1
Vermont 2—by generic commission order, 4a, 4b, 5a, 6d
Virginia 2
Washington 3—by statute, considering a settlement agreement for a Puget Power shareholder incentive mechanism, 4a, 4b, 5b, 6b
West Virginia 1
Wisconsin 1—commission has experimented with shareholder incentive mechanisms but none is in effect, 4a, 4b
Wyoming 1

Utility capital spending surge slated for 1993

Caution of sluggish economy delays spending boom by 1 year

EL&P's Annual Capital Investment Forecast
This exclusive EL&P annual report provides projections and analysis of electric utility spending over the next five years, as well as a look at the issues, events and trends reshaping the industry.

Robert Smock
Editorial Director

It looks like 1993 will be the kickoff year for utility capital spending, according to the latest annual survey of utility spending plans conducted by *Electric Light & Power*.

A surge in spending in the '90s has been foreseen for several years, driven by the need for new capacity and associated transmission systems.

In last year's survey, the onset of the surge was expected to be 1992. However, now it looks like it will be set back one year, probably reflecting utility caution in the face of the sluggish economy. Spending is expected to jump significantly in 1993 to $27 billion (see Table 1) and again in 1994 and 1995 to almost $30 billion in each year.

The new survey shows total outlays reaching only $23 billion in 1992, down substantially from the $27 billion predicted a year ago. However, spending rapidly increases over the next four years, reaching levels in the mid-90s much higher than forecasted a year ago.

The dropoff in 1996 reflects uncertainty about five years in the future more than a prediction for a decline in capital spending. Utility capital spending will probably increase throughout the entire decade.

The beginning of the upswing may be delayed, but it's still expected. In fact, utilities projected a larger five-year total this year, almost $159 billion, compared to last year's $132 billion.

Even though the five-year total is increasing, *EL&P*'s survey does not yet fully reflect the anticipated surge in capital spending for new generating capacity that is widely expected. As can be seen in Table 1, spending for generation is expected to rise over the forecast period, but peak out in 1994.

Other industry observers such as the U.S. Dept. of Energy expect a substantial increase in the rate of power plant additions over the next 20 years – a significant change from the pattern of the last 10 years. DOE predicts that in the 1990s utilities will add from 73 GW to 104 GW of new capacity, much of it not yet under construction or even ordered. That will require sustained increases in generation spending throughout the 1990s.

Table 1. Five-Year Capital Spending
(in millions of $)

Year	Gen.	Substa.	Trans.	Dist.	LM/DSM	Other	Total
1992	8,634	1,528	2,967	6,631	331	3,306	23,396
1993	10,889	1,510	3,480	7,329	395	3,553	27,157
1994	11,948	1,612	3,603	8,208	530	3,912	29,812
1995	11,438	1,461	3,960	8,462	657	3,983	29,960
1996	10,666	1,421	3,725	8,219	287	4,076	28,394
Total	53,574	7,531	17,734	38,869	2,200	18,830	138,739

Table 2. Five-Year Patterns of Capital Spending

	1992	1993	1994	1995	1996
Generation	36.90%	40.10%	40.08%	38.15%	37.56%
T&D	47.55%	45.36%	45.03%	46.37%	47.07%
LM/DSM	1.42%	1.46%	1.78%	2.19%	1.01%
Other	14.13%	13.08%	13.12%	13.29%	14.36%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

EL&P's survey of the electric utility industry covers all types of utilities: investor-owned, municipal, co-op, federal and other public organizations. It was completed in November 1991. Data was obtained from utilities in all regions of the North American Electric Reliability Council and was projected to represent total industry spending.

As shown in Table 1, generation spending is expected to total almost $54 billion over the forecast period, the largest single category. The second largest category is distribution, where spending is expected to rise for the next four years, reaching a total of $39 billion.

Capital spending on transmission systems is also expected to rise through much of the forecast period, reflecting the increase in generation spending. Spending on transmission is expected to approach $4 billion in 1995 and total $15 billion over the forecast period. Spending on substations is expected to remain relatively flat throughout the period, about $1.5 billion.

A new category was added to this year's survey: load management/demand-side management. Capital spending in this area is expected to more than double from 1992 to 1994, rising from $331 million to $657 million; other predictions have shown even higher estimates.

Table 2 shows the trend in spending patterns. Generation rises in importance over the next three years, and load management/demand-side management increases its share for the next five years. The power delivery share remains fairly steady.

Capacity addition plans

In this year's survey, 98 utilities reported their capacity addition plans, up substantially from the 72 companies reporting such plans last year. Table 3 shows the year these companies anticipate needing their next new unit of capacity. The pattern clearly shows a heavy need in the middle of the decade. In addition, many companies anticipate heavy needs after the turn of the century.

As shown in Table 4, construction on these new planned units will start next year and run at a strong pace at least through the middle of the decade.

The type of new unit to be added is shown in Table 5. It shows that 78 percent of the new units will be either gas turbines or combined cycles. Only eight new base-load steam units, three hydro, and nine "other" types showed up in this survey.

The unit size distribution of the new units is shown in Table 6. Half of the new units will be less than 100 MW in size, clearly indicating that they will be gas turbine peakers. Probably most of the 100-MW units will be gas turbines, too.

Table 7 confirms the dominance of gas-turbine capacity in current planning. It shows that oil and gas account for the bulk of new units being planned. Only 5 new coal-fired units are indicated.

Respondees also told *EL&P* that more than 23 GW of new capacity needs has been avoided or delayed through load management or demand-side management programs. They also indicated that an additional 24 GW of new capacity requirements will be satisfied through contracts with non-utility power producers.

Capital spending on existing capacity was also covered in the survey. Respondees said they planned life extension programs (23%), uprating programs (21%), modification projects (23%), and other types of activities (31%) at older plants.

Table 3. Year Anticipate Needing New Capacity

1991	2
1992	10
1993	6
1994	17
1995	10
1996	7
1997	6
1998	4
1999	6
2000	4
>2000	26

Table 4. Year Anticipate Initiating Construction of New Capacity

1991	2
1992	11
1993	10
1994	5
1995	13
1996	7
1997	6
1998	3
1999	5
2000	2
>2000	2

Table 5. Likely Type of Unit to be Added

Base Load Steam	8
Combustion Turbine	49
Hydro or Pumped Storage	3
Combined Cycle	23
OTHER	9

Table 6. Probable Size Next Capacity (MW)

<100	41
100	18
200	9
300	5
400	4
>500	3

Table 7. Probable Fuel For Next Unit

COAL	5
OIL	15
GAS	68
OTHER	6

Regional patterns

Regional spending patterns are shown in the following tables. Starting at the top, utilities in the East Central Area Reliability Council (ECAR) plan to spend $18.7 billion over the five-year forecast period, an 8-percent increase from the level shown in last year's survey. Increases are shown in both generation and power delivery spending plans. ECAR utilities plan heavy levels of capital outlays in 1993 and 1994 for new generation, with spending on power delivery programs rising throughout the period.

East Central Area Reliability Council (ECAR)

	Gen.	T&D	LM/DSM	Other	Total
1992	1,331	1,367	6	379	3,083
1993	1,820	1,599	6	384	3,808
1994	1,844	1,790	9	408	4,051
1995	1,498	1,889	14	349	3,749
1996	1,604	2,191	20	242	4,056
Total	8,097	8,835	55	1,762	18,749

Mid-Atlantic Area Council (MAAC)

	Gen.	T&D	LM/DSM	Other	Total
1992	969	1,022	22	560	2,573
1993	1,153	1,090	22	530	2,795
1994	1,331	1,193	23	585	3,131
1995	1,379	1,351	23	692	3,445
1996	1,400	1,626	32	502	3,559
Total	6,231	6,282	121	2,869	15,503

Utilities in the Mid-Atlantic Area Council (MAAC) plan to spend $15.5 billion over the five-year period, a 6-percent increase over the level predicted a year ago. The mid-Atlantic utilities foresee steadily rising spending on generation, power delivery, and load management throughout the forecast period. Compared to the last survey, they have increased power delivery spending and slightly decreased generation plans.

Electric Reliability Council of Texas (ERCOT)

	Gen.	T&D	LM/ DSM	Other	Total
1992	706	681	9	114	1,509
1993	708	696	13	130	1,547
1994	287	459	21	131	896
1995	252	446	24	147	869
1996	477	730	47	201	1,455
Total	2,429	3,011	114	723	6,278

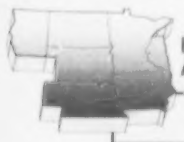
The Electric Reliability Council of Texas (ERCOT) utilities report a lower level of spending in this year's survey, 86.3 billion over the five-year period, which is down 21 percent from the level predicted a year ago. Generation spending over the five-year period is down from $4.6 billion to $2.4 billion, while power delivery spending stayed relatively flat. ERCOT utilities are planning little new generation after the gas-turbine surge of the next two years. Load-management spending is expected to rise at a rapid rate, from $9 million in 1992 to $47 million in 1996.

Mid-America Interpool Network (MAIN)

	Gen.	T&D	LM/ DSM	Other	Total
1992	593	950	33	256	1,832
1993	603	1,046	36	301	1,986
1994	649	1,072	40	341	2,103
1995	628	1,100	40	224	1,991
1996	518	385	59	184	1,147
Total	2,992	4,553	208	1,307	9,059

The Mid-America Interpool Network (MAIN) reported spending plans over the five-year forecast period for $9 billion, up 12 percent from last year's survey. The big increase is concentrated in the power delivery area, up to $4.6 billion from $4.0 billion, and "other" including load management. There was a slight decline in generation plans.

Utilities in the Mid-Continent Area Power Pool (MAPP) plan to spend $4.4 billion over the next five years, up a whopping 16 percent from the level reported a year ago. Generation spending will rise to a total of $1.6 billion and power delivery spending to $1.9 billion. MAPP utilities are not, however, much interested in load management with spending plans at a minimal level over the next five years compared to other regions.



Mid-Continent Area Power Pool (MAPP)

	Gen.	T&D	LM/ DSM	Other	Total
1992	268	354	3	250	874
1993	348	378	1	183	911
1994	258	384	2	197	841
1995	247	381	2	178	808
1996	442	403	2	151	999
Total	1,564	1,900	10	959	4,433

Southeast Power Pool (SPP)

	Gen.	T&D	LM/ DSM	Other	Total
1992	277	837	3	204	1,321
1993	398	934	4	210	1,546
1994	439	1,068	5	217	1,729
1995	514	1,088	5	252	1,859
1996	369	1,419	4	368	2,159
Total	1,997	5,346	20	1,251	8,615

The Southwest Power Pool (SPP) plans spending of $8.6 billion, up 3 percent. Generation spending is expected to double over the next four years, rising from $277 million next year to $514 million in 1996. Power delivery spending is expected to rise substantially throughout the forecast period.

Industry leaders discuss top concerns of next 5 years

DSM, T-Access, PUHCA Reform, NES, Externalities, EMF

Electric utility industry trends, technology, regulation and policy are rapidly changing. Here's a look at some of the key issues and how they'll be reshaping decision-making over the next five years, and beyond.

National energy policy

Linda Stuntz
Department of Energy

Linda Stuntz, of the U.S. Department of Energy, says the National Energy Strategy offers market flexibility. Alternate plans proposed, outside of present legislation, rely heavily on carbon taxes. One extreme case would cost an estimated $300 billion per year to comply, Stuntz says, which would be very detrimental for jobs and the gross national product.

Stuntz is the DOE deputy undersecretary for policy planning and analysis, and acting assistant secretary for fossil energy.

Stuntz expects to be part of a September '92 conference committee that will work out the differences in the Senate and House versions of comprehensive energy legislation. That prediction comes despite the Senate's refusal to consider S.1220 (*EL&P*, 12/91, p.1).

The administration has done and will continue to "implement the balanced and comprehensive initiatives set forth in the National Energy Strategy, and we will continue to do so, with or without Congress," Stuntz says. "Energy and environmental challenges are best met by relying to the greatest extent possible on market forces," contends Stuntz.

The NES encourages greater dialogue between federal and state regulators and among federal agencies. Initiatives expected in coming months include model building efficiency standards and a Federal Energy Regulatory Commission (FERC) notice of proposed rulemaking on market-based pricing of electricity.

Externalities

Stuntz calls externalities – the practice of assigning environmental, societal and other values to resource decision-making – "one of the key energy issues of the '90s." Even though a number of states have developed or are looking at rules, "I haven't seen anything credible enough to base energy procurement on," Stuntz adds.

Clean-air rules, regulations

State regulators generally praise the U.S. Environmental Protection Agency (EPA) for drawing all involved parties into the rulemaking process through activities and recommendations of the Acid Rain Advisory Committee.

William G. Rosenberg, assistant administrator for air and radiation at the EPA, says that in 1991 through November, the EPA proposed 35 clean-air rules and finalized nine. Rosenberg characterizes the participatory process as a desire to "negotiate now, rather than litigate later." Rosenberg adds that the rules allow utilities to choose the most economical way to comply, which will help both ratepayers and utilities in the future.

Brian J. McLean, acting director, EPA Acid Rain Division, praises the market-based flexibilities built into the Clean Air Act Amendments of 1990. Much of McLean's view of the next five years involves setting CAA rules for the 1995 and 2000 deadlines and monitoring compliance. As expected, EPA recently released more than 1100 pages of "acid-rain" rules to reduce SO_2 emissions by 10-million tons by the year 2000, about halving 1980 levels. A rule on the allowance auction and sale was expected by the end of November.

McLean says the industry has to "find ways to integrate environmental problems into financial decision making." He also encourages regulators to establish guidelines for how they treat utilities' compliance strategies.

Allowance trading is going to work as part of the Clean Air Act, Stuntz predicts. Because of uncertainties, some utilities will overcontrol, however. Utilities will need to develop regulatory relationships in advance if they're going to send the right benefits to ratepayers, she adds.

McLean praises utilities and states with an integrated resource planning (IRP) process in place, calling the IRP a "perfect fit," since it "balances the supply and demand sides" and accounts for all compliance

Southeast Electric Reliability Council (SERC)

	Gen.	T&D	LM/ DSM	Other	Total
1992	2,676	2,235	1	424	5,336
1993	3,613	2,441	1	510	6,564
1994	4,566	2,843	1	530	7,940
1995	4,228	2,967	1	634	7,831
1996	3,530	2,335	2	1,319	7,186
Total	18,613	12,821	7	3,417	34,857

Utilities in the Southeast Electric Reliability Council (SERC) have cut their five-year spending projection by 8 percent, down to $34.9 billion in the current survey. Spending is down in both generation and power delivery. This is another area where load management is not particularly popular, with spending plans running at the level of only about $1 million a year – and this is the largest electric reliability council in terms of total capital spending.

Northeast Power Coordinating Council (NPCC)

	Gen.	T&D	LM/ DSM	Other	Total
1992	746	1,367	10	478	2,601
1993	870	1,462	12	537	2,881
1994	853	1,660	14	581	3,108
1995	783	1,677	15	600	3,075
1996	393	886	13	209	1,501
Total	3,646	7,051	63	2,405	13,165

The Northeast Power Coordinating Council (NPCC) plans total spending of $13.2 billion, up 0.5 percent from the year-ago level. Both generation and power delivery plans have declined, but a substantial increase is planned in the "other" category.

Western States Coordinating Council (WSCC)

	Gen.	T&D	LM/ DSM	Other	Total
1992	1,068	2,314	244	641	4,267
1993	1,376	2,674	301	769	5,119
1994	1,720	2,954	414	922	6,011
1995	1,909	3,002	534	907	6,353
1996	1,932	3,391	108	899	6,331
Total	8,006	14,336	1,601	4,138	28,080

Utilities in the Western States Coordinating Council (WSCC) predicted a tremendous increase in capital spending plans this year – $28 billion between 1992 and 1996, which is a 32-percent increase over last year's level. Generation spending climbed to $8 billion from $5.7 billion last year. WSCC utilities expect to spend $1.6 billion on load management and demand-side management over the next five years, which is more than is planned in all the other regions of the country combined.

HENRY STEIN, Senior Editor-Power Production

Document imaging reduces nuclear plant costs, efforts

WHITE PLAINS, NY—Hundreds of employees worked countless hours to prepare the documentation and testimony necessary to construct and operate nuclear Unit 1 of the Comanche Peak Steam Electric Station, as well as the documentation required to meet ongoing regulatory legislation.

"To handle this 'sea of paper' and to support construction of Unit 2," said Randall O. Taylor, program manager for the Texas Utilities Integrated Retrieval Project, "we explored image processing as a cost-effective means to consolidate activities and resolve duplicate manpower efforts."

Many benefits

Results? Retrieval time for document access has been reduced to one minute from the previous of up to three hours. Other benefits from image processing at the TU Electric station include: the ability to route, view and print document requests to any workstation; a reduction in labor requirements for document filing, retrieval and distribution; a reduction in storage costs; and better control of engineering drawing revision levels.

The company also expects a significant usage reduction in their more than 200 copying machines used to produce and distribute the duplicate documents. The imaging system provides multiple users access to the same documents.

About Comanche

Comanche's 1150-MW Unit 1 was placed in commercial operation on Aug. 13, 1990. The 1150-MW Unit 2, which is approximately 90-percent complete, is scheduled to be operational in 1993.

For Unit 1 alone, TU Electric introduced and acquired more than 50-million pieces of paper that were "active documents"--users needed continuing access to them. The information was stored in four areas onsite that took up more than 8.5 miles of shelving.

Each time a document request was received, the pages were reproduced and distributed, to the tune of hundreds of thousands of pages each month. This was a tremendous drain on finances and manpower.

How new system works

Comanche Peak Administrative Services and IBM made a joint development study to define the requirements for the plant's imaging system. When approved by utility management, a project team was created to implement a technical document system to help manage the paperwork associated with building and operating the nuclear facility.

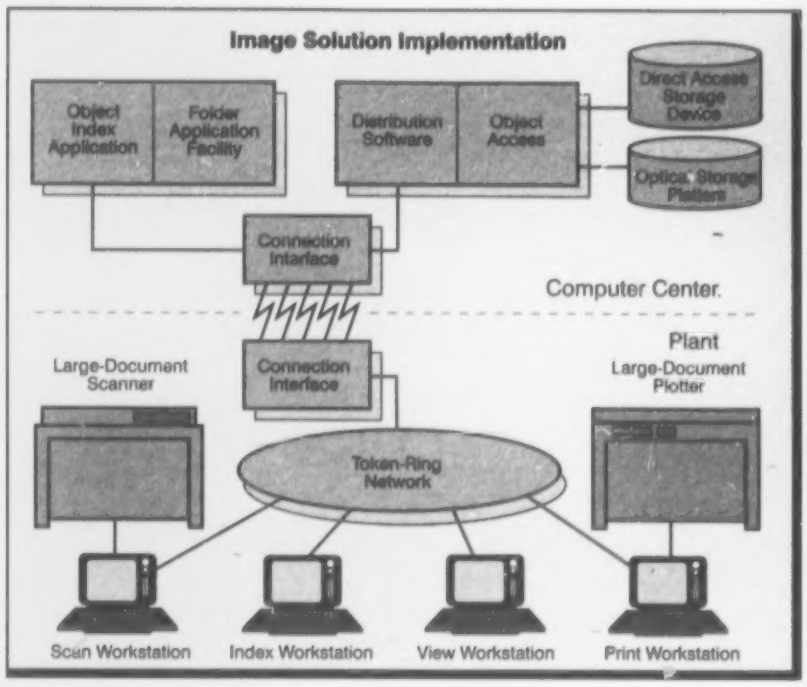
The document management system is based on the IBM ImagePlus Multiple Virtual Storage/Enterprise Systems Architecture Object Management Program. IBM magnetic and optical storage devices, and about 130 IBM Personal System/2 image workstations for plant personnel. It handles a range of plant operating documents that vary in size from 8½ X 11 in. to large-size formats. The documents include quality assurance records, engineering drawings, in-process document level revisions and correspondence.

Scanning, viewing, and plotting are done by Scan-Graphics Inc.'s FriendsPlus application package which runs on the PS/2s using OS/2 Extended Edition software.

Although the Nuclear Regulatory Commission Generic Letter 88-18, as endorsed by Authorized Nuclear Inspector Bulletin 90-3A, allows for use of optical image storage instead of paper records, the utility has not yet destroyed its existing paper records. One reason for this is that the utility's insurance company has so far advised against taking the step. But almost all newly generated information is being stored only as topical images. The exceptions are 1800 vital station drawings for each unit.

Station personnel have already scanned more than 10,500 documents representing approximately 57,000 pages into the system. The process continues.

Previously, a drawing was made, microfilmed, and archived. Then about 100 copies of its aperture cards were made and distributed. Now, a drawing is scanned and digitized into the system. It is instantly available on all the plant terminals. It also is available at the corporate mainframe in Mesquite, TX.

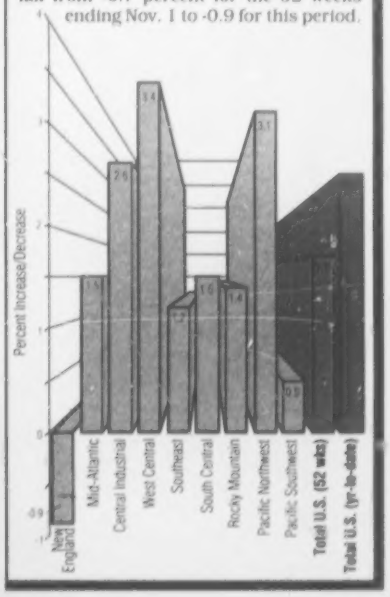


TU considers this a prototype system. The utility may install similar systems at its other plants.

ELECTRIC OUTPUT

Growth Slowed More

The increase in net electric output from the Mainland U.S. electric utility industry picked up slightly for the 52 weeks ending Nov. 23, as reported by Edison Electric Institute. New England's rate continued to fall from -0.7 percent for the 52 weeks ending Nov. 1 to -0.9 for this period.



New World Fuel Cell Council formed

LONDON—The formation of the World Fuel Cell Council was announced here on Nov.4. It is made up of fuel cell system producers and materials suppliers from the U.S., Japan, and Europe. The council will promote commercialization of fuel cells with a marketing and lobbying campaign.

Low emissions

Said Marcus Nurdin, managing director of the council, "The fuel cell is one of the critical technologies which could meet the world's expanding energy needs without harming the environmental integrity of the planet."

Nurdin added that the cells produce less CO_2 than conventional electric gen-

Continued on page 27

NEES commits to cut its air emissions 45% by 2000

WESTBOROUGH, MA—In one of the industry's most sweeping commitments to improve the environment, NEESPLAN 3, the New England Electric System (NEES) companies plan to reduce net air emissions from their operations by an estimated 45 percent by the year 2000.

The companies also are initiating cost-effective strategies to mitigate the effect of so-called Greenhouse Gases by following the recommendations of the National Academy of Sciences.

"NEESPLAN 3 sets three major goals for our system during the 1990s," said President and CEO John W. Rowe. "First, to achieve continuous, measurable reduction of all our environmental impacts, beginning with a 45-percent reduction in our net air emissions.

"Second, to restore stability to our rates by keeping overall rate increases at or below inflation for the balance of the decade...to demonstrate that environmental improvement is possible at affordable cost.

"And finally, to strengthen the diversity of our...resource mix by bringing additional nonutility generation into service, continuing our commitment to conservation and load management, and using natural gas as a generating fuel."

NEES plans to achieve the 45-percent reduction in air emissions through strategies such as:

- Complying with federal and state clean air legislation—11 percent.
- Using nonutility generation predominantly fired by natural gas—10 percent (900 MW by 2000).
- Repowering the oil-fired Manchester Street Station in Providence, RI, into a combined-cycle, natural-gas-fired plant—9 percent.
- Other new power sources entering service between 1990 and 2000, including purchasing electricity from Hydro-Quebec—6 percent.
- Continued conservation and load management efforts—4 percent.
- Methods of offsetting Greenhouse Gas production—5 percent.

Initial targets to reduce primary air emissions include:

- A 53-percent reduction in tonnage of SO_2 emitted, representing a reduction of 74,000 tons/yr between 1990 and 2000.
- A 50-percent reduction in tonnage of NOx emitted, representing 30,000 tons/yr in the same time period.
- A 20-percent reduction in emissions of CO_2 and other Greenhouse Gases, including CO, CH_4, N_2O, and chlorofluorocarbons (CFCs), representing the equivalent of 3-million tons of CO_2.

As for offset strategies, New England Power Co., the generation and transmission subsidiary, plans to solicit proposals for testing public acceptance, and technical and commercial feasibility of such efforts as tree planting, CFC recycling from refrigerators and air conditioners, methane recovery at coal mines, using coal ash in concrete, and enhancing marine algae growth to absorb CO_2.

In addition, NEES intends to initiate pilot projects in such renewable technologies as generation from biomass, waste-to-energy, landfill gas, wind, and solar.

NEES also formed an Environmental Collaborative to assist in developing and implementing the new strategies. The collaborative will include representatives from the NEES companies, the Conservation Law Foundation (a Boston-based environmental group), the New England Council, Massachusetts Institute of Technology, customer advisory councils, and the National Consumer Law Center.